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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/631,855 | 08/01/2003 | Syujiro Morinaga | 2018-759 | 9171 |
| 23117 | 7590 | 11/02/2004 | EXAMINER | |
| NIXON & VANDERHYE, PC 1100 N GLEBE ROAD 8TH FLOOR ARLINGTON, VA 22201-4714 | | | | NGUYEN, TU MINH |
| ART UNIT | | PAPER NUMBER | | |
| | | 3748 | | |

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|--------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/631,855 | MORINAGA ET AL. |
| | Examiner Tu M. Nguyen | Art Unit 3748 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-9 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 01 August 2003 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>080103</u> . | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

1. An Applicant's Preliminary Amendment filed on August 1, 2003 has been entered.

Claims 8-9 have been amended. Overall, claims 1-9 are pending in this application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya (U.S. Patent 5,353,774).

Re claim 1, as shown in Figures 1-3, and 6, Furuya discloses a heating control system for controlling energization to a heater (14) of a gas sensor (10) disposed in an exhaust pipe of an internal combustion engine, the heating control system comprising:

- exhaust pipe water determining means (step S13) for determining whether water droplets exist in the exhaust pipe when the engine is started; and

- activation energization controlling means (18) for performing activation energization control for energizing the gas sensor with electric power capable of heating the gas sensor to activation temperature when a predetermined waiting period passes (step S14 with YES answer and step S15) since the engine is started if the exhaust pipe water determining means determines affirmatively.

Re claim 2, in the heating control system of Furuya, the exhaust pipe water determining means (step S13) requires that an elapsed period from the last start to the last stop of the engine is shorter than a predetermined period (step S14 with NO answer) as at least one of requirements for the affirmative determination.

4. Claims 1 and 3-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Schnaibel et al. (U.S. Patent 5,616,835).

Re claim 1, as shown in Figures 1-3, Schnaibel et al. disclose a heating control system for controlling energization to a heater (114) of a gas sensor (112) disposed in an exhaust pipe (104) of an internal combustion engine (100), the heating control system comprising:

- exhaust pipe water determining means (step 208) for determining whether water droplets exist in the exhaust pipe when the engine is started; and

- activation energization controlling means (128) for performing activation energization control for energizing the gas sensor with electric power capable of heating the gas sensor to activation temperature when a predetermined waiting period passes since the engine is started if the exhaust pipe water determining means determines affirmatively (step 208 with YES answer and step 210).

Re claim 3, the heating control system of Schnaibel et al. further comprises preheat energization controlling means for performing preheat energization control for energizing the gas sensor with lower electric power (P2) than that (P1) in the activation energization control before the activation energization control if the exhaust pipe water determining means determines affirmatively.

Re claim 8, in the heating control system of Schnaibel et al., the heating control system energizes the heater in duty cycle control and sets a smaller on-duty ratio in the preheat energization control than in the activation energization control (lines 28-33 of column 6).

Re claim 9, in the heating control system of Schnaibel et al., the preheat energization controlling means feedback-controls the energization to the heater so that the temperature of the gas sensor is brought to a predetermined temperature (Tsek).

Re claims 4-5, as depicted in Figures 1-3, Schnaibel et al. disclose a heating control system for controlling energization to a heater (114) of a gas sensor (112) disposed in an exhaust pipe (104) of an internal combustion engine (100), the gas heating control system comprising preheat energization controlling means (128) for performing preheat energization control (phase Ib) before activation energization control (phase II) for energizing the gas sensor with electric power capable of heating the gas sensor to activation temperature,

wherein the preheat energization controlling means energizes the gas sensor with lower electric power (P2) in the preheat energization control (phase Ib) than that (P1) in the activation energization control (phase II) during a predetermined period in which there is a possibility that

water droplets exist in the exhaust pipe so that water droplets in the gas sensor vaporize gradually and bumping of the water droplets is prevented.

Re claim 6, the heating control system of Schnaibel et al. further comprises gas sensor water determining means (step 208) for determining whether the water droplets exist inside the gas sensor,

wherein the preheat energization controlling means performs the preheat energization control only when the gas sensor water determining means determines affirmatively (step 208 with YES answer and step 210).

Re claim 7, in the heating control system of Schnaibel et al., the gas sensor water determining means requires that temperature of the heater at the time when the engine is stopped is lower than a predetermined temperature (Tsek) as one of requirements for the affirmative determination.

5. Claims 1, 3, 8, and 9 are further rejected under 35 U.S.C. 102(e) as being anticipated by Shimamura et al. (U.S. Patent 6,476,365).

Re claim 1, as shown in Figures 1, 4, and 5(a), Shimamura et al. disclose a heating control system for controlling energization to a heater (3) of a gas sensor (2) disposed in an exhaust pipe (4) of an internal combustion engine, the heating control system comprising:

- exhaust pipe water determining means (7) for determining whether water droplets exist in the exhaust pipe when the engine is started (also see Figure 5(a) and lines 4-8 of column 9); and

- activation energization controlling means (6) for performing activation energization control for energizing the gas sensor with electric power capable of heating the gas sensor to activation temperature when a predetermined waiting period passes since the engine is started if the exhaust pipe water determining means determines affirmatively (electric power is only applied to the heater when intake temperature is equal to or greater than T_{fx} (see Figure 5 and lines 4-11 of column 9)).

Re claim 3, the heating control system of Shimamura et al. further comprises preheat energization controlling means for performing preheat energization control for energizing the gas sensor with lower electric power than in the activation energization control before the activation energization control if the exhaust pipe water determining means determines affirmatively (the control unit (6) pulses the heater with a frequency based on an internal resistance R_{sn} of the sensor; as shown in Figure 3(b), no electric power is applied to heater when oxygen sensor surface temperature is less than T_{dx}).

Re claim 8, in the heating control system of Shimamura et al., the heating control system energizes the heater in duty cycle control and sets a smaller on-duty ratio in the preheat energization control than in the activation energization control (see comment above).

Re claim 9, in the heating control system of Shimamura et al., the preheat energization controlling means feedback-controls the energization to the heater so that the temperature of the gas sensor is brought to a predetermined temperature (line 65 of column 8 to line 3 of column 9).

Prior Art

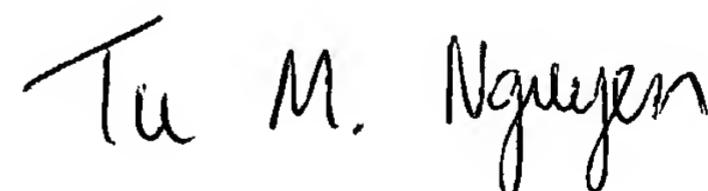
6. The IDS (PTO-1449) filed on August 1, 2003 has been considered. An initialized copy is attached hereto.
7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of three patents: Kojima et al. (U.S. Patent 4,765,298), Uchinami (U.S. Patent 5,518,600), and Ikeda et al. (U.S. Patent 6,304,813) further disclose a state of the art.

Communication

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (703) 308-2833 or (571) 272-4862 to be effective on November 24, 2004.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (703) 308-2623 or (571) 272-4859 to be effective on November 24, 2004. The fax phone number for this group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1148.



TMN

Tu M. Nguyen

October 31, 2004

Patent Examiner

Art Unit 3748